Technical Publication Transfer Test Using Hughes Aircraft Company

MIL-D-28000 (IGES)

MIL-M-28001 (SGML)

DTIC QUALITY INSPECTED 4

Quick Short Test Report

2 April 1992

Prepared for

Air Force Materiel Command

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Prepared By
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This report and those involved in its preparation do not endorse any

product, process, or company stated herein. Use of these means by anyone

does not imply certification by the CALS Test Network.

Contents

1.   Introduction

1.1   Background

The DoD Computer-aided Acquisition and Logistics Support (CALS)
Test Network (CTN) is conducting tests of the military standard
for the Automated Interchange of Technical Information, MIL-STD-
1840A, and its companion suite of military specifications. The
CTN is a DoD-sponsored confederation of voluntary participants
from industry and government managed by the Air Force Logistics
Command.

The primary objective of the CTN is to evaluate the effectiveness
of the CALS standards (Standards) for technical data interchange
and to demonstrate the technical capabilities and operational
suitability of those Standards. Two general categories of tests
are performed to evaluate the Standards, formal and informal.
Formal tests are large, comprehensive tests that follow a written
test plan, require specific authorization from DoD, and may take
months to prepare, execute, and report.

Informal tests are used by the CTN technical staff to broaden the
testing base by including representative samples of the many
systems and applications used by CTN participants. They also
allow the CTN staff to gain feedback from many industry and
government interpretations of the Standards, to increase the base
of participation in the CALS initiative, and to respond, in a
timely manner, to the many requests for help that come from
participants. Participants take part voluntarily and are bene-
fited by receiving an evaluation of their latest implementation
(interpretation) of the Standards, interacting with the CTN
technical staff, gaining experience in use of the Standards, and
developing increased confidence in them. The results of informal
tests are reported in Quick Short Test Reports (QSTRs) that
briefly summarize the standard(s) tested, the hardware and soft-
ware used, the nature of the test, and the results.

1.2   Purpose

The purpose of the informal test reported in this QSTR was to
analyze Hughes Aircraft Company's interpretation and use of the
CALS Standards in transferring technical publications data.
Hughes Aircraft used its CALS Technical Data Interchange System
to produce data in accordance with the standards and delivered it
to the CTN technical staff on a 9-track magnetic tape.

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2.   **Test Parameters**

Test Plan: AFTB 91-039

**Date of
Evaluation:**   24 June 1991

Evaluator: George Elwood
                            Air Force CALS Test Bed
                            AFMC(I)/ENCT
                            Wright-Patterson AFB, OH 45433

**Data
Originator:**   K.W. Virgil
                            Hughes Aircraft Company
                            Building 801/M18
                            P.O. Box 11337
                            Tucson, AZ   85734

**Data
Description:**   Technical Manual Test
                                1 document declaration file
                                1 DTD
                                1 IGES file
                                1 TEXT file

**Data
Source System:**

            IGES
                    HARDWARE
                            Unknown
                    SOFTWARE
                            Unknown

            Text/SGML
                    HARDWARE
                            Unknown
                    SOFTWARE
                            Unknown

**Evaluation
Tools Used:**

            MIL-STD-1840A (TAPE)
                    SUN 3/280
                            CTN TAPETOOL (v1.2.8)   UNIX
                            Agfa Compugraphics CALS

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MIL-D-28000 (IGES)
SUN 3/60
Preview
Igesview
Cheetah Gold 486
AutoCAD 386 R11
CADKEY 386v4

MIL-M-28001 (SGML)
Cheetah Gold 486
Exoterica XGML
DataLogics ParseStation

**Standards
Tested:**

MIL-STD-1840A
MIL-D-28000
MIL-M-28001

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3. 1840A Analysis

3.1 External Packaging

The tape arrived at the Air Force Test Bed enclosed in an envelope and not in a box meeting ASTM D 3951. The exterior of the envelope was not marked with the required magnetic tape warning label, MIL-STD-1840A, para. 5.3.1.3.

The tape was not enclosed in a barrier bag or barrier sheet material as required by MIL-STD-1840A, para. 5.3.1.2. Inspection of the tape reel showed a lack of the required label indicating the recording density as required by MIL-STD-1840A, para. 5.3.1. Some 9-track tape units require this bits-per-inch (BPI) to be set manually. No packing list was enclosed showing all files that were recorded on the tape.

3.2 Transmission Envelope

The 9-track tape received by the Air Force Test Bed contained MIL-STD-1840A files. The files were named per the standard conventions.

3.2.1 Tape Formats

The 1840A tape was run through the AFTB TAPETOOL utility version 1.2.8. Four notes were reported while evaluating the contents of the tape labels. All of these notes pertain to "Invalid record size encountered" errors.   All of the notes are shown in Appendix A, Section One, Tape Catalog.

These notes related to the tape label Record Length field for Type D files. Type D files contain variable length records that do not span blocks. All of the Type D files written on the tape were flagged with an illegal value for Record Length. The D001, and D001T001 files were expected to be Type D according to MIL-STD-1840A. The CTN TAPETOOL Software expects a value of 260 in the Record Length field but encountered a record length of 256. MIL-STD-1840A para. 5.2.1.3 requires the variable record size be a maximum of 256 bytes. ANSI X3.27 para. 7.2.3 further states that the length of a Record Control Word (RCW) must be included in a Measured Data Unit (MDU) record length computation. This adds four bytes to the 256 for an MDU total of 260 bytes. ANSI X3.27 para. 8.5.2.6 states that the Record Length field for Type D files shall contain the maximum length of an MDU. While MIL-

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STD-1840A permits variable length records, some software programs are sensitive to the number 260 because it is used to limit the record size when unblocking data.

No other errors were reported.

3.2.2 Declaration and Header Fields

One error was found in the Document Declaration File header. In Document Declaration File D001, an Invalid change level was flagged. The error related to use of the characters **01-00**. MIL-STD-1840A, para. 5.1.1.2, shows the change level as "ORIGINAL". Only "ORIGINAL" or the change number and date is permitted in this record.

```
chglvl: 01-00
*** ERROR (MIL-STD-1840A; 5.1.1.2) - Invalid change level encountere
*** NOTE (MIL-STD-1840A; 5.1.1.2) - Change level should be the word
    a Revision Number followed by a Change Level Number followed by
    a Change Level Date. They should be separated by a comma or space
```

The two data files, D001T001 and D001Q001, had serious errors in the header records. All of the record identifiers were in upper case. MIL-STD-1840A, para. 5.1.4, shows all of these record headers in lower case. Since UNIX is case sensitive, this is a critical error. Because of these errors, the header information was not evaluated by the program. A manual inspection revealed no errors. The error log is shown in Appendix A, Part Two, in this report.

The tape was also read using the AGFA Compugraphics "read1840A" utility. Because of the incorrect record names (UPPER CASE), the program would not read any of the files.

The actual file names on the tape were incorrect. MIL-STD-1840A, para. 5.1.3, requires that files be numbered starting at 001 and incremented by one for each file. File D001T001 should have been named D001T002. A suggested change to MIL-STD-1840A has been made to change the file numbering to the method used on the tape.

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4.   IGES Analysis

The IGES file was tested against four IGES translators available in the AFTB. Two on the UNIX system, Igesview and Preview, and two on the MSDOS system, AutoCAD and CADKEY. Hard copies of the resulting plots are included in Appendix C on this report. The only program to generate an error message was Rosetta's Preview. This message is not an error with the file but a statement of limitation with the Sun system and Preview in the double precision area. It is limited to 32-bit floating point while the sending system was capable of 64-bit floating point precision.

Note that on the AutoCAD hard copy only a small part of the drawing was displayed. This is a problem with the AutoCAD IGES translator. AutoCAD did translate the file but only showed a small part included within a "paper space." Working with AutoDesk, the entire image was displayed on the screen. This process took several steps. Use of the AutoCAD IGES translator could result in this problem in a document if the document processing software used AutoCAD DXF file structure.

The UNIX based systems did not display any text while both MS-DOS systems did. The problem of the text may be related to the Subordinate Entity Switch being set physically dependent.

All systems displayed the arrow as a series of lines starting from the point and expanding out. Note this feature in the CADKEY detailed drawing. This is a correct presentation as there are no 214 Form 3 entities in the file.

Although shown as solid lines on the Preview hard copy, the dotted lines showed as dotted lines on the screen.

5.   SGML Analysis

The text file from this document was tested using the Software Exoterica XGML parser. The file parsed without error.

The text file was also parsed using the DataLogics ParserStation. Again, the file parsed without error.

6.   Raster Analysis

No raster files on tape.

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7.   **CGM Analysis**

No CGM files on tape.

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8.   **Conclusions and Recommendations**

In summary, the MIL-STD-1840A tape from Hughes Aircraft
Company had some serious tape header problems. The incorrect
header format caused one tape reading utility to fail immedi-
ately. Because of this format problem, the tape did not meet
MIL-STD-1840A.

The errors with the IGES have not been pinpointed.   The errors
may be in the IGES translators in use by the AFTB. All transla-
tors generated usable images except AutoCAD, which required sev-
eral steps to move the image into a viewable area.

The text file was parsed without error using two different pars-
ers.

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9.   **Appendix A - Tape Tool Report Logs**

9.1   **Tape Catalog**

CALS Test Network Catalog Evaluation - Version 1.2; Release Number 8

  Standards referenced:
    MIL-STD-1840A (1987) - Automated Interchange of Technical Information
    ANSI X3.27 (1987) - File Structure and Labelling of Magnetic Tapes
                          for Information Interchange
    ANSI X3.4 (1986) - Coded Character Sets - 7 Bit ASCII

Mon Jun 24 11:08:53 1991

MIL-STD-1840A File Catalog

File Set Directory: /cals/tapetool8/Set023

                                                                  Page: 1

                                              Record
                                              Format/   Block   Selected/
File Name   File Type   Length   Length/Total Extracted

D001   Document Declaration D/00256 02048/000001 Extracted
*** NOTE (MIL-STD-1840A; 5.2.1.3) - Unexpected maximum variable record size
    encountered. Header => 256, Expected => 260
*** NOTE (ANSI X3.27; 8.5.2.6) - Record Length for Recording Format Type D
    shall be the maximum length of a Measured Data Unit (MDU).
*** NOTE (ANSI X3.27; 7.2.3) - A variable length record shall be contained
    in an MDU. An MDU consists of a four byte Record Control Word (RCW)
    followed immediately by the variable record.
*** NOTE (ANSI X3.4) - A Record Control Word shall consist of four characters
    that express the sum of the lengths of the RCW and the variable record.
D001T001   Text   D/00256 02048/000003 Extracted
*** NOTE (MIL-STD-1840A; 5.2.1.4) - Unexpected maximum variable record size
    encountered. Header => 256, Expected => 260
D001Q001   IGES   F/00080 02000/000071 Extracted

Catalog Process terminated with 0 error(s), 0 warning(s), and 5 note(s).

9.2   Tape Evaluation Log

CALS Test Network Tape Evaluation - Version 1.2; Release Number 8
  Standards referenced:
    ANSI X3.27 (1987) - File Structure and Labelling of Magnetic Tapes
                        for Information Interchange
    ANSI X3.4 (1986) - Coded Character Sets - 7 Bit ASCII

Mon Jun 24 11:08:48 1991

ANSI Tape Import Log

Allocating tape drive /dev/rmt0...

/dev/rmt0 allocated.

                    <<<<< PART OF LOG REMOVED HERE >>>>>

############ End Of Tape File Set #############

Deallocating /dev/rmt0...

Tape Import Process terminated normally.

9.3   Tape File Set Validation Log

CALS Test Network File Set Evaluation - Version 1.2; Release Number 8
  Standards referenced:
    MIL-STD-1840A (1987) - Automated Interchange of Technical Information

Mon Jun 24 11:08:53 1991

MIL-STD-1840A File Set Evaluation Log

File Set: Set023

Found file: D001
Extracting Document Declaration Header Records...
Evaluating Document Declaration Header Records...

srcsys: IBM LDL
srcdocid: 9317
srcrelid: Hughes Sample documenmt
chglvl: 01-00
*** ERROR (MIL-STD-1840A; 5.1.1.2) - Invalid change level encountered.
*** NOTE (MIL-STD-1840A; 5.1.1.2) - Change level should be the word ORIGINAL or
    a Revision Number followed by a Change Level Number followed by

     a Change Level Date. They should be separated by a comma or space.
dteisu: 19910614
dstsys: af
dstdocid: AF.01.0003
dstrelid: SAMPLE TECH MANUAL
dtetrn: 19910615
dlvacc: AF-04-55
filcnt: T1, Q1
ttlcls: UNCLASSIFIED
doccls: UNCLASSIFIED
doctyp: SGML
docttl: HUGHES SAMPLE

1 error(s), 0 warning(s), and 1 note(s) were encountered
in Document Declaration File D001.

Found file: D001T001
Extracting Text Header Records...
Evaluating Text Header Records...

SRCDOCID: 9317
*** ERROR (MIL-STD-1840A; 5.1.4) - Invalid Text header;
    field name. Expected => srcdocid:
*** NOTE - The value in the header field may not be evaluated.
*** NOTE - Correction made in new %s Header File.
DSTDOCID: AF.01.0003
*** ERROR (MIL-STD-1840A; 5.1.4) - Invalid Text header;
    field name. Expected => dstdocid:
*** NOTE - The value in the header field may not be evaluated.
*** NOTE - Correction made in new %s Header File.
TXTFILID: W
*** ERROR (MIL-STD-1840A; 5.1.4) - Invalid Text header;
    field name. Expected => txtfilid:
*** NOTE - The value in the header field may not be evaluated.
*** NOTE - Correction made in new %s Header File.
DOCCLS: UNCLASSIFIED
*** ERROR (MIL-STD-1840A; 5.1.4) - Invalid Text header;
    field name. Expected => doccls:
*** NOTE - The value in the header field may not be evaluated.
*** NOTE - Correction made in new %s Header File.
NOTES: Base SGML file on the tape
*** ERROR (MIL-STD-1840A; 5.1.4) - Invalid Text header;
    field name. Expected => notes:
*** NOTE - The value in the header field may not be evaluated.
*** NOTE - Correction made in new %s Header File.

5 error(s), 0 warning(s), and 10 note(s) were encountered
  in Text File D001T001.

Saving Text Header File: D001T001_HDR
Saving Text Data File: D001T001_TXT

Found file: D001Q001
Extracting IGES Header Records...
Evaluating IGES Header Records...

SRCDOCID: 9317
*** ERROR (MIL-STD-1840A; 5.1.4) - Invalid IGES header;
    field name. Expected => srcdocid:
*** NOTE - The value in the header field may not be evaluated.
*** NOTE - Correction made in new %s Header File.
DSTDOCID: AF.01.0003
*** ERROR (MIL-STD-1840A; 5.1.4) - Invalid IGES header;
    field name. Expected => dstdocid:
*** NOTE - The value in the header field may not be evaluated.
*** NOTE - Correction made in new %s Header File.
TXTFILID: A
*** ERROR (MIL-STD-1840A; 5.1.4) - Invalid IGES header;
    field name. Expected => txtfilid:
*** NOTE - The value in the header field may not be evaluated.
*** NOTE - Correction made in new %s Header File.
FIGID: 1
*** ERROR (MIL-STD-1840A; 5.1.4) - Invalid IGES header;
    field name. Expected => figid:
*** NOTE - The value in the header field may not be evaluated.
*** NOTE - Correction made in new %s Header File.
SRCGPH: hughes1
*** ERROR (MIL-STD-1840A; 5.1.4) - Invalid IGES header;
    field name. Expected => srcgph:
*** NOTE - The value in the header field may not be evaluated.
*** NOTE - Correction made in new %s Header File.
DOCCLS: UNCLASSIFIED
*** ERROR (MIL-STD-1840A; 5.1.4) - Invalid IGES header;
    field name. Expected => doccls:
*** NOTE - The value in the header field may not be evaluated.
*** NOTE - Correction made in new %s Header File.
NOTES: Drawing of a wing
*** ERROR (MIL-STD-1840A; 5.1.4) - Invalid IGES header;
    field name. Expected => notes:
*** NOTE - The value in the header field may not be evaluated.
*** NOTE - Correction made in new %s Header File.

7 error(s), 0 warning(s), and 14 note(s) were encountered
  in IGES File D001Q001.
Saving IGES Header File: D001Q001_HDR
Saving IGES Data File: D001Q001_IGS

Evaluating numbering scheme...

*** ERROR (MIL-STD-1840A; 5.1.3) - The data files for Document D001
    were not numbered properly.
*** NOTE (MIL-STD-1840A; 5.1.3) - The first data file for a
    Document shall use "001" and the number shall increment
    sequentially for each file of the Document so that each
    file has a unique file name.
Renumbering data files...
Renumbering Text File from => D001T001 to => D001T002
Updating Map File for Document D001
*** NOTE - 1 file(s) were renumbered.
Numbering scheme evaluation complete.

Checking file count...
No errors were encountered during file count verification.
File Count verification complete.

A total of 14 error(s), 0 warning(s), and 25 note(s) were
encountered in Document D001.

A grand total of 14 error(s), 0 warning(s), and 25 note(s) were
encountered in this File Set.

MIL-STD-1840A File Set Evaluation Complete.

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10. Appendix B - SGML Parser Logs

10.1 XGML Parser Log

No reported errors.

10.2 DataLogics Parser Log

No reported errors.

11.   Appendix C - IGES Error Log

11.1 **CADKEY**

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hughes.igs -> hughes.prt
Start section:

IGES version - 4.0
Date of creation: 06/07/91

Entities Translated:
          20 Circular Arc types
           2 Conic Arc types
         122 Copious Data types
         114 Line types
          20 Point types
           2 Transformation Matrix types
          38 Associativity Instance types
           1 Drawing type
           1 View type

Entities Not Translated:
           2 Property types

Special Notes
          View Entities
              View at D:5 placed in Level #241
          Drawing Entities
              Drawing at D:1 placed in Level #241 and contains 1 views

11.2   **Preview ERROR LOG**

ERROR REPORT FOR FILE   D001Q001_IGS

>> File record length is 80

Terminate section report :

```
            File Section      #lines
       +-------------------------------+
       |           START       1       |
       |           GLOBAL      2       |
       |    DIRECTORY ENTRY    654     |
       |    PARAMETER DATA     1097    |
       |         TERMINATE     1       |
       |                               |
       |           TOTAL       1755    |
       +-------------------------------+
       (Expect 80 X 1755 = 140400 bytes)
```

-------------- preliminary format scan complete --------------

>> WARNING: Cannot use maximum power of 10 requested.
     : Requested maximum power of 308 using 307.
     : Field 11 line 1 of GLOBAL section. (Max. Exp. for Double)
1H,,1H;,,4HTEST,7HIBM CAD,3H1.0,32,38,6,308,15,,1.0,1,2HIN,10000,100.0, G   1

Found 0 errors and 1 warnings